Remarks

Reconsideration and allowance of the subject application are respectfully solicited.

Claims 1, 3-10 and 12-18 remain pending in the application, with Claims 1 and 10 being independent. Claims 1 and 10 have been amended herein.

Claims 1, 3-10 and 12-18 were rejected under 35 U.S.C. § 102 as being anticipated by European Patent Application No. 0 496 533 (Yano et al.). This rejection is respectfully traversed.

As is recited in independent Claim 1, the present invention relates to a method of filling a buffer portion in a print head with at least one bubble, using a print head comprising a plurality of ejection openings through which ink is ejected, a plurality of channels that are each in communication with a corresponding one of the plurality of ejection openings, a common liquid chamber for supplying ink to the plurality of channels, a buffer portion located at an end of an arrangement direction of the channels and adjoining at least one of the channels in communication with at least one corresponding ejection opening to restrain vibration of ink in the common liquid chamber which occurs as a result of ejection of the ink, and bubble generating means for filling the buffer portion with at least one bubble. The method includes the steps of filling the buffer portion with the at least one bubble by driving the bubble generating means and executing a recovery process of discharging the ink through the ejection openings after the bubble filling step. In the recovery process step, excess of the at least one bubble filled in the buffer portion is removed.

As is recited in independent Claim 10, the present invention relates to a printing apparatus able to print an image on a printing medium, using a print head comprising a plurality of ejection openings through which ink is ejected, a plurality of channels that are each in communication with a corresponding one of the plurality of ejection openings, a common liquid chamber for supplying ink to the plurality of channels, a buffer portion located at an end of an arrangement direction of the channels and adjoining at least one of the channels in communication with at least one corresponding ejection opening to restrain vibration of ink in the common liquid chamber which occurs as a result of ejection of the ink, and bubble generating means for filling the buffer chamber with at least one bubble. The apparatus includes recovery process means which causes the ink to be discharged through the ejection openings. The recovery process means causes the ink to be discharged through the ejection openings after the bubble generating means has filled the buffer portion with at least one bubble, and discharges the ink through the ejection openings to remove excess of the at least one bubble.

With the above arrangement and method, during bubble filling, if the bubble(s) overflow(s) the buffer portion, the overflow bubble(s) is (are) quickly removed through channels by a recovery process. This is possible because the buffer portion adjoins at least one channel which is in communication with at least one corresponding ejection opening.

Yano et al., as described in Applicants' specification, is directed to an ink jet printer that introduces air bubbles in an ink chamber to function as buffers. The bubbles

can absorb discharge energy in the form of pressure waves directed toward the common liquid chamber so that refilling after discharge can be quickly performed.

As understood by Applicants, Yano et al. describes structure for generating a bubble in a liquid passage for ejecting ink, storing the bubble in a common liquid chamber, and removing the bubble by a recovery process. However, in Yano et al., the bubble is merely stored in the common liquid chamber. Accordingly, Yano et al. cannot disclose or suggest a buffer portion located at an end of an arrangement direction of channels and adjoining at least one of the channels in communication with at least one corresponding ejection opening to restrain vibration of ink in the common liquid chamber which occurs as a result of ejection of the ink, as is recited in independent Claims 1 and 10. That is, Applicants submit that in Yano et al. when the bubble is removed, the bubble does not always adjoin the liquid passage because the bubble moves throughout the common liquid chamber. Accordingly, a large amount of ink must be ejected in order to remove the bubble.

Thus, Yano et al. fails to disclose or suggest important features of the present invention recited in independent Claims 1 and 10.

Thus, independent Claims 1 and 10 are patentable over the citations of record. Reconsideration and withdrawal of the § 102 rejection are respectfully requested.

For the foregoing reasons, Applicants respectfully submit that the present invention is patentably defined by independent Claims 1 and 10. Dependent Claims 3-9 and 12-18 are also allowable, in their own right, for defining features of the present

invention in addition to those recited in their respective independent claims. Individual consideration of the dependent claims is requested.

This Amendment After Final Rejection is an earnest attempt to advance prosecution and reduce the number of issues, and is believed to clearly place this application in condition for allowance. This Amendment was not earlier presented because Applicants earnestly believed that the prior Amendment placed the subject application in condition for allowance. Accordingly, entry of this Amendment under 37 CFR 1.116 is respectfully requested.

Applicants submit that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the rejection set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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